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THE BAROMETER IN HIGH SOUTHERN LATITUDES.

By Commander NORMAN H. FARQUHAR, U. S. NAVY.

In submitting the following, I am aware that I may be assailed with the remark that a rule cannot be laid down from observations during so limited a period, or only at one season; in which I fully agree. Still as a glimpse of the sun, when running for your port, is better than no observation at all, so I trust that my experience may be, at least, a ray of light.

The subject of the Barometer off Cape Horn has been one of fruitful inquiry and discussion, some asserting its reliability and others the reverse; one theory after another broached, only to be controverted. One party laying down rules from its operations on the adjacent shores and islands, others again after beating, and being tossed about for many days, till almost in depair, deny the assertions of the former.

Some, like our great Maury, (to appreciate whom one needs to make this long passage from San Francisco around Cape Horn), theorizing from the disjointed statements of others and their abstract logs, say "More light is required."

Captains King and Fitzroy of the Royal Navy, who spent several seasons, at different times, surveying, (and whose charts are everlasting monuments to their intelligence and indefatigability) do not agree.

Captain King says, "With respect to the utility of the barometer, as an indicator of the weather that is experienced off Cape Horn, I do not think it can be considered so unfailing a guide as it is in the lower or middle latitudes."

"Captain Fitzroy, however, has a better opinion of the indications

shown by this valuable instrument; "My opinion is, that although the rise or fall at times precedes the change, yet it more frequently accompanies it." *Narrative of the Voyages of the Adventure and Beagle, Vol. I., p. 465.*

And that fine weather may occur when the barometer is very low, as above stated, the following extract from the same work will demonstrate; "April 2nd, 1830, (near Cape Horn) the glass had been falling so much, and was then so extremely low, that I thought it prudent to prepare for the worst, and struck topmasts.

Notwithstanding the unusual fall of the barometer and sympieósometer, and their still continuing to sink, this day was as fine, and seemed likely to continue so, as any day I had ever seen, therefore we took advantage of it.

3rd and 4th.—Still very fine weather, although the barometer and sympieosometer were lower than I had yet seen them in this country.

5th and 6th.—Two more fine days, with a very low glass, shook my faith in the certainty of the barometer and sympieosometer.

During those days the wind had been light from N. N. W. and twice before I had known these instruments to be similarly affected during exactly similar wind and weather.

The mercury in the barometer had now failen to 28.94, and the oil in the sympieosometer to 28. 52; the thermometer ranging from 40° to 48° Fahrenheit.

10th.—Still fine, steady weather, notwithstanding the unusually low fall of the barometer.

12th.—The glasses had at last been rising; and during the past night and this day the wind was very strong, with much rain.

The wind shifted from the northern quarter into the southern, drawing round to the S. E., which, of course, would make the mercury rise higher after being so very low, though the weather might prove extremely bad." *Ibid. pp. 426—429. South Atlantic Memoir, page* 8.

Captain Mayne, Royal Navy, who spent some time also in these latitudes a few years ago, in command of the Nassau, says; "The backing of the wind from S. W. to N. W. is always accompanied by a falling barometer, or its ceasing to rise, as it does during the whole time it blows from S. W.

The change of wind, however, usually accompanies the change in the barometer, and the mercury merely ceasing to rise may indicate the S. W. wind subsiding.

If the wind backs from N. to N. E. the same dirty weather may be

expected that is mentioned as usual when it draws round to the E. from the Southward, and generally the seaman may be prepared for bad weather when the wind backs, even though the barometer does not fall.

Northerly winds are often preceded by low flying clouds, with a thickly overcast sky, in which the upper clouds appear at a great height.

The sun shows dimly through them with a reddish appearance, and with its edges so indistinct that it is impossible to take an altitude, often for hours, before a gale comes on.

Sometimes, but very rarely, with the wind light between N. N. E. and N. N. W. a few days fine weather may occur.

Each day of this must be gratefully received as it comes, for it cannot be predicted, and occurs sometimes with a high and at times with a low barometer.

Easterly winds are certainly more common, and the strait is on the whole less windy in winter (June, July, and August,) than in summer; but when against this possible advantage is placed the cold, with the long nights and short days, this season is not likely to be preferred by the mariner in a vessel bound westward.

Though beyond the limits of this chapter, it may be well to mention that ships getting as far as Cape Froward with a S. W. wind will generally find it N. W. on rounding the cape, as the wind follows the direction of the channel.

Captain King, after remaining nearly a year in Port Famine, and a considerable time in the eastern part of Magellan Strait, came to the conclusion that the barometer could not be considered so unfailing a guide as in the lower and middle latitudes, and that, although the rise and fall do sometimes precede the change, yet they more frequently accompany it.

After two seasons careful observation, the writer coincides in this opinion, as far as the actual strait itself is concerned." *Pages 99 and 100 of Gen. Ex. Atlantic Ocean.*

"As a rule, the wind will be found stronger from the S. W. and the squalls heavier from the N. W., and no certain warning is given of this shift.

Sometimes the Barometer precedes it, but more generally accompanies it." *Page 99.*

"It has already been said, when speaking of this shift of wind from the N. W. to S. W., that the barometer invariably rises with it, and the only rule which we can give as at all settled is, that a rising bar-

ometer precedes or accompanies a shift of wind from N. W. or W. to S. W., and that generally, if the mercury falls while it is blowing from S. W. the wind will back to N. W. again; but in both these cases, nine times out of ten, the two events will occur simultaneously." *Page 101. General Examination Atlantic Ocean.*

"My object in writing," says the late Rear Admiral, [then Captain] Bailey, of the United States Ship St. Mary's, "is to call your attention to the barometrical indications south of Staten Land and Terra del Fuego, and to the regularity and certainty with which the mercury falls with a northerly wind and rises with a southerly.

At this season—the summer—an easterly wind is rare, and, if it occurs, is of short duration. We found none.

The north or northwest winds are usually accompanied by cloudy, rainy, or misty weather; soon after it sets in, the mercury begins to fall, and continues to sink as long as the wind has nothing in it, when there is usually an interval of calm or light, variable winds, lasting two or three hours; after which it veers to the southward or southwestward, squally, precipitating the mists in the form of hail and sleet, and exposing (at the S. W.) clouds of the cumulus character.

At this point the mercury begins to rise, and continues ascending as long as the wind has southing in it.

A low barometer (say 28.50) will thus react with a southerly wind, and a high barometer (say 29.90) with a northerly.

This has been my experience, after three passages around Cape Horn, in which my attention has been directed to this phenomenon.

And so fully convinced am I of the truth of my experience, that I would advise ships (after passing the Straits of Le Maire, which is free from all danger, saving thereby at least one degree of westing), having a northerly wind and a falling barometer, to stand on a wind to the southward, confident of the wind s direction, so long as the mercury tends to fall.

If it reaches a minimum somewhat below twenty nine inches, and a calm ensues, equally to be certain of a "southwester," and to be in a position, if possible, to profit by it."

Rear Admiral Hoff, (then Captain) commanding John Adams, encloses a report of his navigator, Commander, (then Lieut.) E. P. McCrea, which says: "Regarding the Barometer, it never failed us while west of Cape Horn, and told us faithfully the approach and abatement of all the gales; off the Falkland Islands it was not so correct, though we had no gales, but drizzling, rainy weather and easterly winds."

"I have never known the barometer to range so low, and know not what to make of it."—*B. Buxton, ship Union.*

"A most extraordinary fluctuation in the barometer, from 30.03 inches to 29.3 inches, the weather and appearance giving no indication of storm or rain."—*Robert Mc Cerran, ship Defiance.*

"The barometer continues to fall, although the wind is southwest. I have always seen it rise with the wind from that quarter."—*W. B. Daniels, ship Seaman.*

"The barometer ranges the highest with the wind W. S. W., and lowest from the northward. It either accompanied or followed the change, never preceded it." *John Gillan, barque Delegate.*

"I do not see that it (the barometer) is a guide to be depended upon. Certainly my experience this passage would show its fall followed by delightful weather."—*R. F. Coffin, ship Senator.*

"I have Maury's Sailing Directions, and I find that almost all the captains who have furnished him with abstracts have had something to say about their barometers when in the vicinity of Cape Horn; and as there is a good deal of disagreement, I thought I would add my opinion to theirs, while every circumstance is fresh in my memory.

In the first place, I have two barometers, one belongs to the ship, the other to myself. Mine I have had six years, and used almost constantly for that time and have become in that time pretty well acquainted with its workings; for that reason I have used my own barometer altogether in this log, though it differs materially from the ship's. In fine weather, when my barometer was at 30.00, the ship's stood at 29.; in heavy weather when mine stood 28.50, the ship's stood 28.40 or 28.35; at 29 inches they were both alike.

Now, as to the use of a barometer off Cape Horn, so far as I can judge, they work as well and are of much use there as anywhere; though I think it requires considerable study to understand the workings of the mercury in such high latitudes.

I think my barometer stood in 58° south latitude three-quarters of an inch lower than it would in the same amount of wind or storm off Cape Hatteras.

I notice some of the captains say the barometer always falls in a northerly wind, and it does not blow hard from that quarter.

I noticed this myself; but my barometer always stayed down, and most always continued to fall till the wind came to the southwestward and blew heavily, then it would begin to rise.

My barometer and also the ship's, I have known to be down to 28.50

inches, several times for twenty-four and sometimes for over thirty hours before the blow came on; but it always came, and as soon as it came and got fairly to blowing, the barometer started up.

Every hard westerly blow I have had about Cape Horn, I have had a low mercury before it came on."—*William Fales, ship Star.*

"June 11, 9 A. M. barometer falling; land in sight about Cape Pinas; noon, quite thick and dark; barometer 29.35; lower than I have noticed it before; no change in the weather except the fog.

Thus far I have made no remarks upon the barometer. If I should dare to hazard an opinion, would say that, with the wind at N. E. and E., north of the equator, it ranges highest; and with southerly winds south of it, and particularly south of Capricorn, lowest; or, at least, that southerly winds may be expected when low, and westerly and northwesterly when quite high; though we have had our highest wind (even a terrific gale for a few hours) after the barometer had fallen to 29.40 some two hours and stopped. I think it was rising at the time; wind from about west, perhaps a little northerly and inclining southward.

Running along the land; wind veering north; saw what looked like snow on the mountain tops; at 10 p. m. up with Cape Diego in sight; at the end of the day in the straits; weather getting fair; wind strong at N. W."—*O. G. Lane, ship Victory.*

"Sept. 2. Lat. 56° S., long. 65° W.

At 9 P. M. light wind from S. W., wore ship.

At 10 P. M. calm, squall gathering from S. S. W.; in royals and clewed up everything except topsail and foresail; but before we got through, it struck us, and I was glad that I was so well prepared for it.

It blew very hard for three hours; close reefed fore and mizzen topsails, and double reefed main topsail and mainsail. Latter part, heavy gales and hail; ship under the same sail. We seem to be pursued by contrary winds.

(I see in your book of directions that some of the captains state that they do not consider the barometer as a guide in high southern latitudes; but I differ from them although I may not have had as much experience as some of them, having been thirteen years at sea, of which time I have been captain six years.)

I think if the glass falls three or four tenths in a few hours, it is almost positive that it will be succeeded by a gale or very heavy gust which will last several hours, although the simple fact that the barometer falls does not, as a natural consequence, predict wind; it only

shows that there is a commotion in the atmosphere in your vicinity which may be succeeded by wind or rain, but I think more likely by the former." *John Zeega, Queen of Clippers.*

On the other hand, other opinions are adverse; I quote a few more pro and con:

"The barometer remains low all the time; it appears to be of no use here."—*D. C. Landis, ship F. W. Brune.*

"Barometer useless."—*W. L. Phinney, ship Kentucky.*

"The mercury here appears to be very lively; will rise and fall from 30.10 to 29.16 rapidly; but it is to be observed that this variation is not attended with the same degree of increase and decrease of wind that we experience elsewhere. Consider the barometer here of very little use."—*T. Dahlgren, barque Byron.*

"Barometer rising; but find it no guide whatever."—*S. M. Hudgins, barque Hugh Birkhead.*

"Barometer unsteady: squalls the same, without any apparent effect on the barometer. I do not trust to it."—*Charles A. Ranlett, ship Surprise.*

"The mercury fell this day 1.42 inches, and no wind to speak of."—*W. E. Putnam, ship Empress of the Seas.*

"I watch the barometer closely; but do not think it is to be depended on here as in the North Atlantic Ocean.—*Samuel Harding, ship Robert Harding.*

"My barometer has been almost useless since I was in the latitude of the Rio de la Plata. The heaviest gales I had, it ranged from 29.15 to 29.40, and it has been as low as 28.35 with a whole sail breeze. It has, however, invariably fallen for a northerly wind and risen for a southerly one. It has ranged during the last six weeks from 28.35 to 30."—*Oliver H. Sanders, ship B. Howard.*

Captain Hull. says, "My barometer tells the weather here to a charm."

Captain Littlefield says: "Never, in one instance, has my barometer deceived me," and *Captain Scott* remarks; "Thus far, I think the barometer has been an infallible guide as to the weather." *pp. 447–449 Maury's Sailing Directions.*

June 2, Latitude 47° 46′ S., long. 47° 46′ E.

Barometer, 29.10; air, 31°; water, 35°.

Winds, N. and E. N. E.

Commences with light air, and variable, with heavy snow squalls; midnight, weather and wind the same.

6 A. M., calms, and heavy dark clouds coming up from N. N. W.

Barometer falling very fast.

Noon, light breeze springs up from the north.

Barometer still falling; there must be a heavy gale close upon us from the sudden fall of the mercury.

June 3, Lat. 48° 19′ S. long. 52° 35′ E.

Barometer, 28.40; air, 32°; water, 37°.

Winds; E. N. E. to W.

First part light breeze.

Barometer still falling; midnight, observed the fluctuation of barometer about ½ inch in the tube, the wind coming in gusts, with a howling noise. Sea tumbling about in all directions.

8 A. M., fine, pleasant weather; noon, the same.

Barometer rising slowly.

June 4, Lat. 48° 13′ S., Long. 53° 00′ E.

Barometer, 28.60; air, 31°; water, 34°. Winds, W.

Begins with moderate breeze, and variable from W. N. W. to W. S. W.

Weather getting a little settled.

Barometer rising; midnight, squalls and snow showers; noon, wind and weather the same.

June 12, Lat. 46° 18′ S., long. 89° 31′ E.

Barometer, 29.05; air, 42°; water, 42°. Winds, S. S. E. to S. W.

Commences with light breezes with sleet; wind variable from S. W. to N.

At 1 P. M., wind S. E; tacked to N. E.

Midnight, clear and wind hauling southerly.

I have always experienced as soon as the wind (along here) gets into N., that it hauls round easterly into S. W., and blows from that quarter; when the gale has reached its height, it then begins to veer northerly by west, and the barometer begins to rise fast, until the wind gets into the north; it then stands whilst the wind retraces its westerly course round into S. E., and then blows again; latterly falls calm, and the wind again springs up from N. W.

Noon, light breezes and wind westing.

June 18, Lat. 42° 47′ S., long. 115 54′ E.

Barometer, 29.20; air, 40°; water 48°. Winds, W. to S. W.

First part, breeze freshening; at 6 P. M., wind S. W. and freshening; at 8. 30 P. M., in all starboard stunsails, ship going 21 knots, with main skysail set; midnight, fresh gale and fine clear night; 8 A.

M., wind and weather same; noon, less wind, attended with snow squall.

June 19, Lat. 42° 42′ S., long. 118° 00′ E.

Barometer, 29.40; air, 48°; water, 51°. Winds, W. to S. W.

Commences with fresh gales and sleet squalls.

Midnight, wind strong, and hauling to northward; at 4 A. M., wind N. N. E.; tacked to the N.; 8 A. M., wind S. W.; with drizzling rain; noon, fresh breeze, and fine, clear weather.

June 22, Lat. 41° 40′ S., Long. 134° 58′ E.

Barometer, 29. 30; air, 50°; water, 51°. Winds; N. W. to W. Commences with strong breezes and squally; at 5 P. M. ship was, struck with a most terrific squall, which lasted in full strength only about three minutes.

The ship broached to, blew away all head sails, fore topsail, fore topgallant sail, main topmast and middle staysails, mainsail and main top gallant sail, mizzen lower and mizzen topmast staysails; carried away main top gallant mast, and main yard.

I never before experienced such a terrific gust of wind. The barometer gave no indication, whatever, of the approach of the squall.

Midnight, moderate breezes and fine clear weather, with frequent flashes of lightning; 8 A. M., fine and clear; noon, wind hauling to N. W., with light rain at intervals. *Abstract log of the ship "James Baines," (Charles McDonnell, Commander,) from Liverpool to Melbourne; 28 days out, pp. 644, 5 and 6, Maury.*

Again Maury, *pages 583 and 584*, says;

"The barometer, especially in high southern latitudes, is very puzzling, particularly to those navigators who have been cruising mostly in the North Atlantic.

There are many rules, in truth almost as many rules as there are generalizers, for telling by the mercury how the wind and weather are to be off Cape Horn, and how they are to be in the long stretch for easting both on the outward and homeward route from and to Australia.

I am free to confess that I have never yet been able to discover the actual relation between barometric pressure and the weather off Cape Horn and in those high southern latitudes; nor have I been able to give any rule by which the mariner might certainly fortell the approaching storm in those seas."

Captain George W. Brown, of the "Kitty Simpson," who is a very close observer and clever navigator, in his abstract log, says:

July 3rd, 1857, Latitude 48° 09′ S., Longitude 87° 54′ E. Barometer, 28.86. Wind, North West.

First part, moderate breezes, thick and rainy; middle, light winds, with foul looking weather, and squalls with rain.

5 A. M., wind suddenly from S. W., with squalls and rain.

9 A. M., hard squalls; reefed the main topsail and took in the jib; ends wind on the increase; passed much kelp; numerous Petrels and other birds about.

I fully expected a gale from the N. or N. E., with such a low glass. (28.70 in.)

I find by experience a low barometer does not but rarely indicate them, unless it falls during the time it is blowing from these quarters.

In this, as in the South Atlantic and Pacific oceans, a low glass with baffling winds and unsettled weather (I mean in the high latitudes) is almost a sure precursor of a S. W. gale, hauling suddenly to that quarter a few hours after the column has fallen to 28.70, or perhaps a tenth or two lower; and also if the barometer falls with a northerly gale and continues to fall after the gale ceases, or remains steady at 29.00, or less, then look out for a sudden shift from S. or S. W., after which the silver will rise fast or not, according to the force of wind.

In the heaviest gales from W. or N. W., the glass seldom falls below 29.30, (that is my own experience.)

I may here remark that a low barometer does not always indicate wind from any particular quarter, for on the 13th and 14th of June, with the glass at 29 inches on the average, I had south and easterly winds, with various kinds of weather, calms, &c.; but such cases I think, but seldom transpire: indeed I am at a loss to know what influenced the mercury to act so contrary to the general rule, for a high glass is always experienced with S. E. winds.

July 7, Latitude, 46° 39′ S., Longitude, 103° 28′ E.

Barometer, 28.80. Winds; west.

First part, calm and cloudy; middle part, fresh breezes, and thick, rainy weather; latter, light breezes, with cloudy weather and rain till 7 A. M.

Saw plenty of kelp, some of which I caught; it appeared to have been in the water a long time, being covered with barnacles.

Numerous albatross and other sea fowl about. I was much surprised to see a large black land bird, something like a ganney, hovering overhead for more than an hour, seeing there is no land that is known

hundreds of miles from us; yet it is my opinion there are islands in this vicinity.

The color of the water, the peculiar weather, the various birds, the abundance of kelp, and the indescribable feeling of the air, denote it.

The barometer fell to 28.60 with a southerly wind again, which lasted but a few hours, when it hauled to west, the glass rising a couple of tenths, the wind gradually increasing.

Now what is the meaning of the mercury being so low with southerly winds and calms?

This is the second time it has shown me that the silver does not fall always for wind, nor in fact any particular kind of weather, except, indeed, it be for S. E. wind, which I have always found the barometer to rise for heretofore."

The barometer is an instrument by means of which the pressure of the air at a particular place may be measured.

If there were no tides nor winds, and if the sea and the air were perfectly calm in the whole region between the two places, then the actual pressure of the air at the level of the sea must be the same in these two places; for the surface of the sea is everywhere perpendicular to the force of gravity.

If therefore the pressure on its surface were different in two places, water would flow from the place of greater pressure to the place of less pressure till equilibrium ensued.

Hence, if in calm weather the barometer is found to stand at a different height in two different places at the level of the sea, the reason must be that gravity is more intense at the place where the barometer is low.

The intensity of gravitation varies at different places, being less at the equator than at the poles, and less at the top of a mountain than at the level of the sea. (*Maxwell Theory of Heat.*)

Now a barometer is also effected by the density of the atmostphere or by its rarefaction.

In other words, storms are propagated by rarefaction of the air and the outside air rushing in to restore the equilibrium; when this rarefaction is sudden, hurricanes are the result.

Heat produces this rarefaction, and we all know how a warm winter's day is followed by a storm.

These two causes, in my opinion, explain all.

In the first place we admit that gravity is more intense at the poles than at the equator; hence a lower barometer.

Secondly.—The theory of the Trade winds, supposes the air at the equator to be heated, consequently expanded, hence lighter and therefore brings a low barometer, the cold air rushes in to take its place; now this air from the equator flows towards the poles charged with vapor and finally replaces the trade winds; forming the westerly winds.

Ansted's Physical Geography, pages, 236 and 256, says: "The main cause of the frequent oscillation of the barometer, and also of the permanent difference that exists in the mean barometric pressure at different parts of the earth's surface, is that the whole body of the atmosphere is made up partly of air and partly of vapor; and as vapor, volume for volume, is lighter than dry air and takes its place, the evaporation due to changes of temperature sensibly alters the pressure.

The dry-air atmosphere is thus the heaviest, and corresponds to a high pressure.

The vapor-atmosphere is the lightest, and when it takes the place of the other the barometer shows it by falling.

This is quite independent of any alteration of the height of the column of air, such as is produced by the action of the sun and moon, or by the difference of level at different stations.

To understand fully the important influence of vapor in lowering the pressure of the air, it must be remembered that three-fourths of the atmosphere is compressed within the five miles nearest the earth, and that dry air is no less than forty per cent heavier than the same volume of vapor, at the same temperature.

Thus, the pressure of a dry-air atmosphere being equal to that of 30 inches of mercury, that of a vapor atmosphere replacing it would only be 21½ inches.

But, if a part of the vapor-atmosphere be condensed into water, heat is given off by the change in condition, and the vapor that remains, absorbing this extra heat, becomes lighter, so that the height of the whole atmospheric column being the same, the column of mercury in the barometer (representing the pressure of the atmospheric column) must sink still lower.

Thus, when there is constant precipitation there must be a low barometer.

We have already remarked, that the barometer stands at a higher point in the calm latitudes between the tropics and temperate zones than elsewhere.

It has also been observed, that in the Antarctic regions the mean

height of the column of mercury is less than 29 inches at the sea level, whereas in the Arctic regions it is nearly an inch higher.

This accumulation of pressure in the northern hemisphere is due to the excess of land in that part of the world; for while in the southern hemisphere the winds passing almost entirely over the sea are loaded with vapor, the winds reach the Polar seas over vast tracts of dry land, and are thus comparatively dry

The vapor-atmosphere thus occupying so large a part of the whole air in the Antarctic district, is also frequently condensed into rain or snow, and in this operation large quantities of heat are set free.

Such heat warms and rarefies the air, and thus lowers the barometer still more, in a manner explained in a previous page. (237.)

For a similar reason the barometer is low under the equator.

The Trade winds pressing as it were into this belt. and being always loaded with vapor, the air is permanently moist.

But the heat at the surface is very great, and the heated, moist air, rises rapidly into cooler regions where it is condensed into rain.

In this condensation a large quantity of heat is set free, so that the vapor that remains in the air is still more expanded, and the whole column of air is rendered light. As the expanded air rises it flows off towards the poles.

The atmosphere at the equator is thus probably higher than elsewhere, although it exerts a lower pressure."

Coming from the Equator or High Barometer, being becalmed several days in the vicinity of Cape Horn, and having the winds while in that neighborhood from every quarter, and in all kinds of weather have all combined to give me more experience than usual to one coming from the Pacific to the Atlantic.

Add to which a very short crew, a desire to make a good passage it may be imagined that a careful study was made of the barometer.

The westerly winds were first encountered, as the result of a gale experienced from the Nd.

I quote from my Remark Book: December 3rd, Latitude 33° S. Long. 128° W. Wind Nd. and Ed. Barometer 30. 30. Wind increasing and hauling to Nd. and Wd. Barometer falling, rainy, dirty weather

At 7.15 A. M. December 4th, Latitude 38° S. Long., 127° W. barometer fell to 29.70 going down .20 inches in two hours; for a short time wind lulled, then came out in a furious squall from S. S. W.

Fortunately we were prapared for this change, having reduced sail.

The barometer having reached this height remained so for some days when it rose slowly the wind back to the Nd. by the West; after there remaining stationary for some time, it again fell, the wind coming out once more S. W., this last stand was again retained for some time until a rise accompanied a northerly wind, which finally backed to East.

Barometer then stationary it fell calm for some hours; then wind westward barometer falling at S. W., reached a level; again it rose after a day or so, and continued rising, the wind backing by way of West to North then E. N. E. and S. E.; finally barometer reaching 29.40 the wind came out fresh and squally from S. W., soon blowing a gale, which sent the "Portsmouth" flying past Cape Horn.

My conclusions on the subject of the barometer off Cape Horn or in High Southern Latitudes, may be summed up as follows.

Admit that naturally a low barometer exists there, and assume it.

When the barometer is above its mean, good weather; when it falls to reach this mean, also good weather; when steady at high barometer, moderate winds; steady low barometer, fresh winds.

Wind S. W. first rise; wind back to Nd.

Should it continue to rise, it will go to Ed, and finally South by way of East, S. S. E. its highest then a fall; S. W. again and dirty weather.

Should however the wind reach N. W. from S. W., and the barometer fall, the wind will come out S. W. again.

S. E. to S. S. W. winds brought dirty, thick weather, hail, rain and fogs.

N. W. weather was rainy and squally.

Easterly weather very pleasant, as also S. W., after it had blown for some hours and cleared off.

I failed to find any premonition of the weather from observations of the Thermometer; its changes always accompanied the changes in wind and never preceded them.

The lowest point reached was 35° Fah.

I subjoin a table of the mean heights of the Barometer as given on an Ice Chart furnished by the Hydrographic Office.

AT 32° FAHRENHEIT.

Lat. 30° " 35°	30.08	Lat. 50° " 55°	29.48.
Lat. 35° " 40°	29.98	" 55° " 60°	29.27
" 40° " 45°	29.90	" 60° " 65°	29.13
" 45° " 50°	29.75	" 65° " 70°	29.03